

Weight and See: A Case Report of 'Heavy Eyeball Syndrome'

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INTRODUCTION

- *Strabismus fixus convergence* is a rare form of acquired strabismus with progressive esotropia and hypotropia in the setting of high myopia^{1,2}.
- Limitation in abduction and elevation is a key feature
- Due to an inferior shift of the lateral rectus and a nasal shift of the superior rectus the eyeball appears to be sitting lower in the orbit than normal, hence 'Heavy Eyeball Syndrome' (HES)
- HES should be differentiated from 'Sagging Eye Syndrome' which typically presents in an older non-myopic population, endocrine ophthalmopathy, Duane retraction syndrome, Myasthenia gravis and cranial nerve palsies^{2,3}.

AIM

To describe a case of Heavy eyeball syndrome – focusing specifically on the investigation and management thereof.

EXAMINATION

Main complaint: 15 year old ♀ with poor vision since a young age, progressive squint affecting the right eye more than the left, peculiar 'awareness' of the right eye when looking up or outwards. No diplopia.

Birth / Medical / Surgical history: NAD

Previous ophthalmology history: 'thick' spectacles to see distant objects since the age of three. No previous trauma or surgery.

6/60	VA	6/60
6/12	BCSVA	6/12
90 ^Δ ET, 10 ^Δ hypoT	Alt. prism test	10 ^Δ hyperT
See Fig 1	EOM	NAD
NAD	A/S	14
15	GAT	
Tilted disc, 0.5 vertical CDR	Fundus	Tilted disc, 0.5 vertical CDR
Posterior staphyloma		Posterior staphyloma
Tessellated		Tessellated
- 17.50 DS	Auto-Refraction	- 15.00 / -1.00 @ 20°
30.09 mm	AL	29.85 mm
+	FDT	-

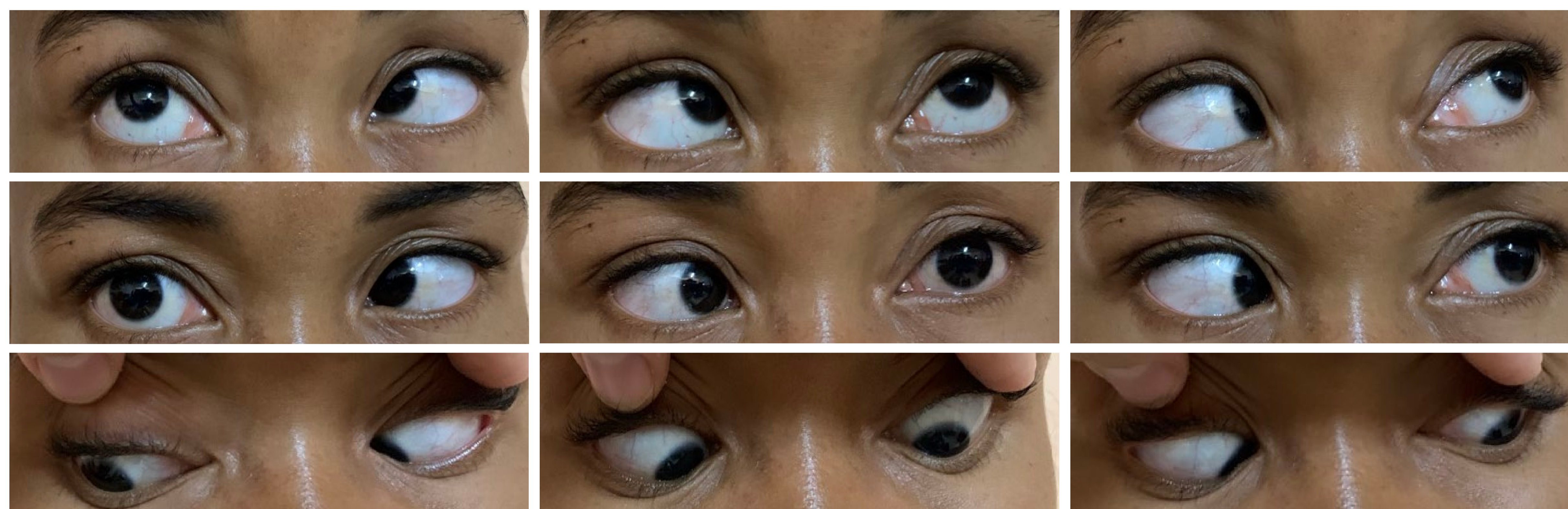


Figure 1: Versions of gaze showing severe restriction in abduction and elevation of the right eye

DISCUSSION

- HES is thought to be as a result of dysfunctional muscle insertions of the lateral and superior recti muscles. An inferiorly displaced LR reduces the ability of the eyeball to abduct and increases infraduction, while nasal displacement of the SR limits supraduction and increases adduction³.
- The angle formed between the SR and LR is termed the **dislocation angle** as shown in Figure 2. Yamaguchi *et al.* showed that patients with highly myopic strabismus to have a mean angle of dislocation of $179.9^\circ \pm 30.8^\circ$ compared to normal controls of $102.9^\circ \pm 6.8^\circ$ ($p < 0.001$)⁴. An increased dislocation angle combined with the increased axial length of myopia allows herniation of the globe between the LR and SR, further exacerbating adduction and hypotropia.
- Surgical approaches can be broadly divided into traditional recession-resection and loop myoplexy:
 1. *Recession-resection*: provides acceptable results in early disease with small deviation and mild abduction restriction. If LR displacement is severe this may in fact worsen the alignment.
 2. *Loop Myoplexy*:
 - a. *Yokoyama's Procedure*: Full loop myoplexy of the SR and LR muscle belly 15mm posterior to their insertions with a polyester suture⁵.
 - b. *Partial Jensen Procedure*: SR and LR split in half from insertion to past the equator and opposed to one another⁵. See Figure 3.
 - c. *Yamada's Procedure*: Not strictly a loop myoplexy as muscle bellies secured to sclera and not joined together. SR and LR divided in half 15mm posterior from insertion, with temporal half of the SR and superior half of the LR secured to the sclera midway between the two muscles 7mm posterior to the limbus. MR recessed by 8mm⁵. This procedure carries an increased risk of morbidity as the sclera is easily perforated and therefore is less frequently performed.
- Selection of the surgical procedure is based on surgeon skill and familiarity with the procedure, the results of the forced duction test and the degree of esotropia.
 - *Loop myoplexy* is generally more effective than traditional *recession-resection* techniques except in cases of small deviation with relatively normal muscle paths as assessed by MRI.
 - MR recession can be done at the time of surgery if the Forced Duction Test (FDT) is positive (indicating likely contracture) or if the surgeon assesses the likely residual angle to be very large. Many surgeons choose to delay the MR recession due to unpredictable results as well as to preserve the arterial integrity of the eye (which may already be compromised)⁵.
 - Full *loop myoplexy* can correct up to 40^Δ of deviation and 12 - 85^Δ if combined with a MR recession. A *Partial Jensen Procedure* is typically reserved for large deviations over 90^Δ see Figure 4⁵.

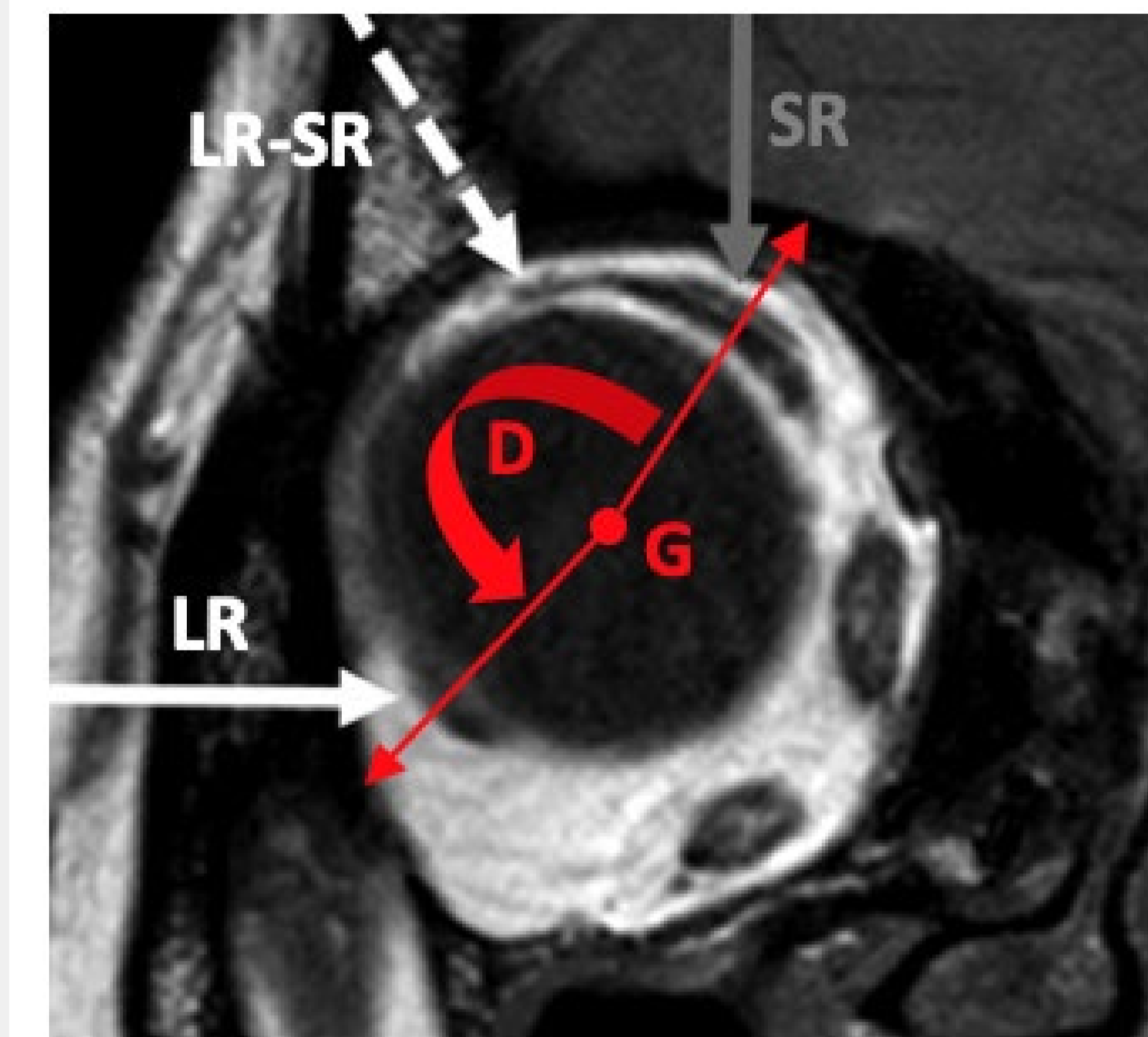


Figure 2: MRI of right orbit of a patient with HES showing inferiorly displaced lateral rectus (white arrow), nasally displaced superior rectus (grey arrow) and temporally thinned and degenerated lateral rectus-superior rectus band (broken white line). Centre of globe (G) and angle of dislocation (D)⁶.

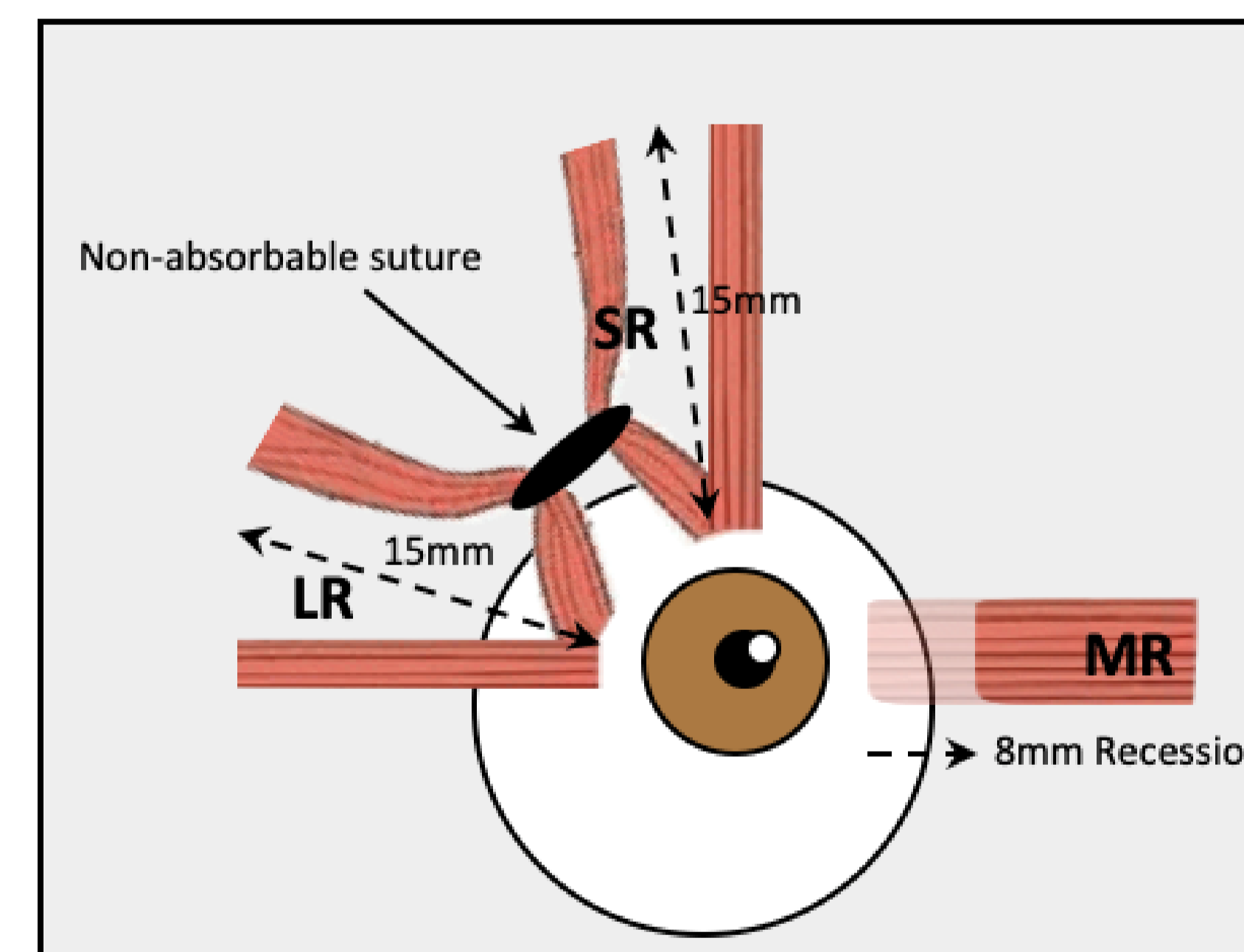


Figure 3: *Partial Jensen procedure* of the right globe. Medial Rectus (MR), Superior Rectus (SR), Lateral Rectus (LR)

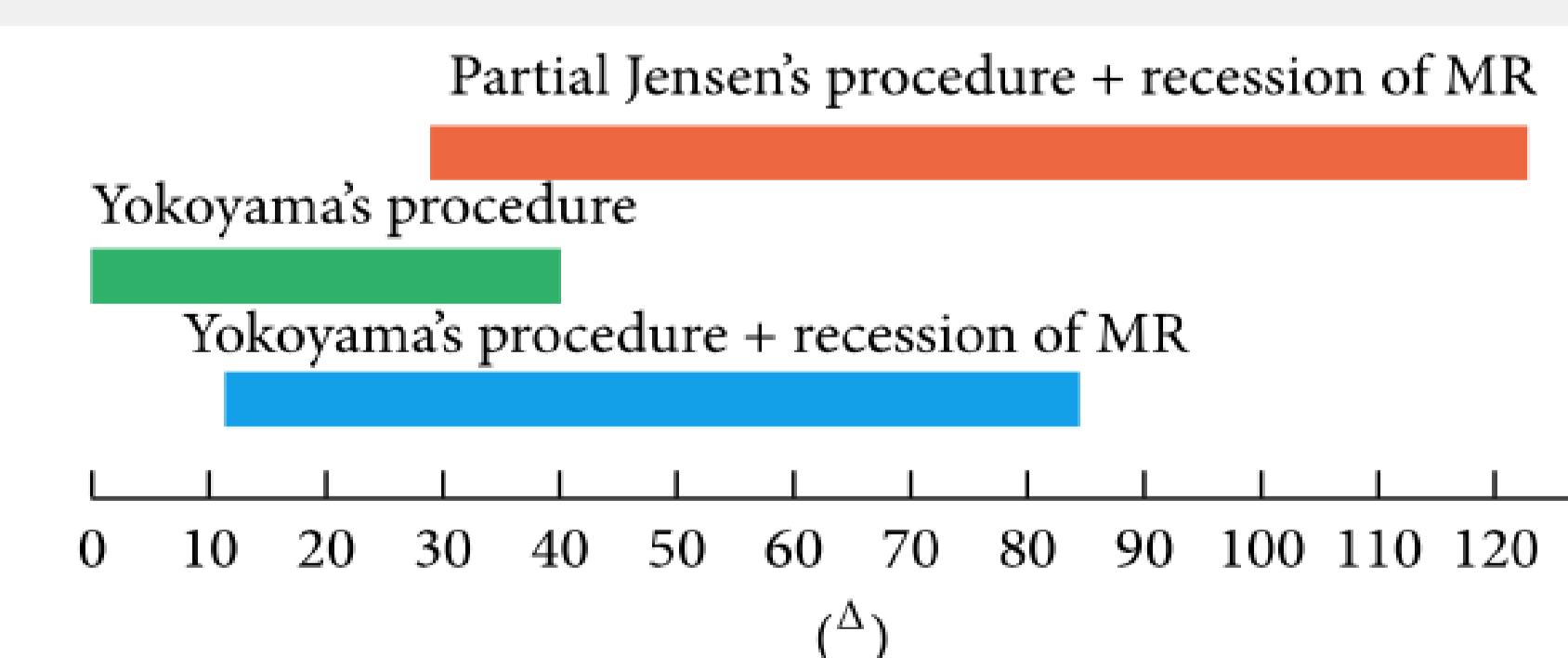


Figure 4: Scope of procedures based on dioptric deviation⁵

CONTACT INFORMATION

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CONCLUSIONS

Our patient is currently being managed with myopic spectacle correction and biannual dilated fundus exams while we await the outcome of her MRI. Her mother wishes for her to finish the school year before surgery is considered. A *Partial Jensen Procedure* will likely be offered to her for the right eye.